



PATENT
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.: 10/732,829 Group Art Unit: Unknown
Filing Date: December 11, 2003 Examiner: Unknown
Applicants: Steven TERPSTRA Conf. No.: Unknown
Title: EXTRACTION APPARATUS

PRIORITY LETTER

March 10, 2004

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sirs:

Pursuant to the provisions of 35 U.S.C. 119, enclosed is/are a certified copy of the following priority document(s).

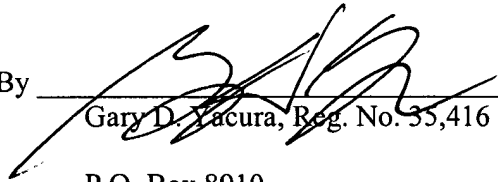
<u>Application No.</u>	<u>Date Filed</u>	<u>Country</u>
PR 5664	June 13, 2001	Australia
2003905884	October 24, 2003	Australia

In support of Applicant's priority claim, please enter this document into the file.

Respectfully submitted,

HARNESS, DICKEY, & PIERCE, P.L.C.

By


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**Patent Office
Canberra**

I, JONNE YABSLEY, TEAM LEADER EXAMINATION SUPPORT AND SALES hereby certify that annexed is a true copy of the Provisional specification in connection with Application No. PR 5664 for a patent by TERPSTRA ENTERPRISES PTY LTD as filed on 13 June 2001.

WITNESS my hand this
Sixteenth day of December 2003

A handwritten signature in cursive script that reads 'J R Yabsley'.

JONNE YABSLEY
TEAM LEADER EXAMINATION
SUPPORT AND SALES

ORIGINAL
AUSTRALIA

Patents Act 1990

PROVISIONAL SPECIFICATION

Invention Title: "Extraction Apparatus"

The invention is described in the following statement:

"Extraction Apparatus"

Field of the Invention

This invention relates to an extraction apparatus and to a machine incorporating such extraction apparatus.

- 5 The extraction apparatus according to the invention has been devised particularly, although not solely, for use with a machine used to perform cutting and chasing operations on brickwork and masonry.

Background Art

- 10 It is common to chase a groove or trench into brickwork and masonry to accommodate service lines such as electrical and other cabling, and water and gas supply lines. Typically a chasing operation is performed using a machine having one or more cutting blades.

- A significant amount of dust can be generated during a chasing operation and there is now legislation in Western Australia requiring suppression of the dust.
- 15 The dust is commonly suppressed using water sprayed into the vicinity of the chasing operation, typically onto the cutting blade.

The use of water to suppress dust leaves a slurry on the surface being chased as well as in the worksite generally. When the slurry dries, it reverts to the dust which can then create further problems.

- 20 Furthermore, the use of water to suppress dust precludes the use of electrical machinery, such as electrical grinders which were previously a preferred option for performing chasing operations.

- The inability to use electrical machinery requires that other sources of power be utilised. One suitable source of power is a machine driven by an internal
- 25 combustion engine. Such a machine does, however, have a disadvantage in

that its exhaust gases are potentially dangerous, particularly when the machine is operated in confined areas.

It is against this background, and the difficulties and problems associated therewith, that the present invention has been developed.

5 Disclosure of the Invention

The present invention provides an extraction apparatus for a machine having a tool for performing a working operation on a workpiece and a drive motor for driving the tools, the drive motor having an exhaust through which an exhaust fluid is discharged during operation of the drive motor, the extraction apparatus
10 comprising a means for delivering a dust suppression fluid to the vicinity of the tool for suppression of dust generated thereby, a shroud disposed about the tool for containing the dust and the dust suppression fluid, and an extraction line, the extraction line communicating with the shroud for extracting dust and dust suppression fluid contained by the shroud, the extraction line also
15 communicating with the exhaust of the drive motor for receiving the exhaust fluid generated thereby.

The workpiece may be of any appropriate form. Where the machine is employed to perform a chasing operation on a surface (such as a wall surface or floor surface), that surface may constitute the workpiece.

20 Preferably, the shroud is movable to accommodate changes in orientation of the apparatus with respect to the workpiece. In this way, an effective seal can be achieved between the shroud and the workpiece so as to minimise leakage.

The extraction line may incorporate a flexible section to accommodate the movement of the shroud.

25 Typically, the extraction line is connected to a suction source such as a vacuum pump. The extraction line may be connected to the suction source by way of a suction hose.

The dust suppression fluid may be delivered to the shroud by way of a fluid delivery line.

Typically, the dust suppression fluid comprises water.

5 The suction hose and the fluid delivery line may be conveniently connected together for handling as a single unit. This may be achieved by accommodating the fluid delivery line in the suction hose for at least part of the length thereof. The shroud may incorporate a barrier arranged for preventing rubble and other debris generated during operation of the tool from entering the shroud and clogging the extraction line and suction hose connected thereto.

10 Water used as the dust suppression fluid may also serve a purpose of lubricating the tool. Additionally, the water content of the slurry may serve to cool the exhaust gases, thereby preventing the otherwise hot exhaust gases from damaging the suction hose.

15 The invention also provides a machine for performing a working operation on a workpiece, the machine comprising a tool receiving means for receiving a tool for performing the working operation, a drive motor operable to drive the tool, the drive motor having an exhaust through which an exhaust fluid is discharged during operation, means for delivering a dust suppression fluid into the vicinity of the tool for suppressing dust generated thereby, a shroud disposed about the
20 tool for containing dust and the dust suppression fluid, and an extraction line, the extraction line communicating with the shroud for extracting dust and dust suppression fluid contained thereby, the extraction line further communicating with the exhaust of the drive motor for receiving the exhaust fluid discharging therefrom.

25 Typically, the drive motor is an internal combustion engine such as a petrol engine or a diesel engine, in which case the exhaust fluid comprises exhaust gases from the combustion process.

The tool may be of any suitable type, although as alluded to earlier the extraction apparatus and machine according to the invention have been devised particularly for use in chasing and cutting operations in which case the tool is typically a cutting wheel or a plurality of cutting wheels (usually two such wheels) mounted
5 in tandem.

Brief Description of the Drawings

The invention will be better understood by reference to the following description of one specific embodiment thereof as shown in the accompanying drawings in which:

10 Figure 1 is an elevational view from one side of a machine according to the embodiment;

Figure 2 is an elevational view from the other side of the machine;

Figure 3 is a front elevational view of a part of the machine; and

15 Figure 4 is a schematic side elevational view of a hose assembly for use with the machine.

Best Mode(s) for Carrying Out the Invention

Referring to the drawings, there is shown a cutting machine 10 for performing cutting and chasing operations on wall and floor surfaces.

20 The cutting machine 10 comprises a work head 11 and a body 13 carrying the work head 11. The body 13 incorporates a drive unit which in this embodiment is in the form of a petrol engine 15 having an exhaust 17.

The drive head 11 receives and supports a cutting tool 19 which in this embodiment is in the form of a cutting blade. The cutting blade 19 is driven by the engine 15 through a drive belt (not shown) enclosed in a guard 21.

The body 13 is provided with a side handle 23 and a rear handle 25 which incorporates controls including a control trigger 27 for controlling operation of the engine 15.

5 A shroud 31 is mounted onto the drive head 11 about the cutting blade 19. The shroud 31 comprises a body 33 which encloses part of the cutting blade 19 and an opening 35 beyond which the cutting blade extends, as shown in the drawings. With this arrangement, the shroud has an edge 37 which is adjacent the opening 35 and which is adapted to locate against the surface in which the blade 19 is performing a chasing operation. The shroud 31 incorporates
10 removable section 38 to provide access for mounting and removal of the cutting blade 19.

The shroud 31 is mounted for angular movement with respect to the drive head 11 between two extreme positions to accommodate changes in the orientation of the body 13 so that the edge 37 can be maintained in sealing contact with the
15 surface in which the chasing operation is being performed while the machine is being moved over the surface. In Figure 2 of the drawings, the shroud 31 is illustrated in one extreme position and the other extreme position is depicted in outline by dotted lines 39.

The opening 35 in the shroud 31 is fitted with a barrier 41 having a slot 43
20 through which the blade 19 can extend. The purpose of the barrier 41 is to exclude the entry of rubble and other large debris generated during operation of the blade 19 from entering the shroud. There is, however, sufficient clearance between the slot 43 and the blade 19 to allow dust generated during operation of the cutting blade 19 to enter the shroud 31, as will be explained. The clearance
25 space includes gap 45 shown in Figure 3 of the drawings.

The purpose of the shroud 31 is to contain the dust and also to contain a slurry generated by water used to suppress the dust. Water for dust suppression purposes is injected into the shroud 31 through a water inlet 52. The water inlet
51 includes a fitting 53 to which a water supply line 55 is adapted to be
30 connected, as will be explained later. The water inlet 51 opens onto the interior

of the shroud 31 by way of several ports (not shown) through which water is directed onto the cutting blade 19.

The injected water is distributed within the shroud 31 by the rotating action of the blade 19 and suppresses the dust generated by the blade by formation of a slurry. Additionally, the injected water functions as a cooling fluid for the cutting blade 19. Furthermore, the injected water may provide some noise suppression.

An extraction line 61 is mounted onto the body 13. The extraction line has an outlet end 63 adapted to be connected to a suction hose 65, as will be explained later. The extraction line 61 extends to and communicates with the shroud 31 at 67 for extracting the slurry generated by the dust and water. The extraction line 61 incorporates a flexible section 69 which accommodates angular movement of the shroud 31 with respect to the drive head 11 between the two extreme positions of the shroud.

The exhaust 17 of the internal combustion engine 15 is also connected to the extraction line 61 such that exhaust gases from the engine are discharged into the extraction line. This ensures that the exhaust gases are carried away from the worksite rather than being discharged into the air at the worksite.

A hose assembly 71 is provided for use with the machine 10. The hose assembly 71 comprises the water line 55 and the suction hose 65. The water line 55 has one end 56 thereof adapted for connection to the fitting 53 on the water inlet 51. The other end 58 of the water supply line 55 is adapted for connection to a source of water under pressure such as a mains supply.

One end 66 of the suction hose 65 is adapted for connection to the outlet 63 of the suction line 61. The other end 68 of the suction hose 65 is adapted for connection to a vacuum source such as a vacuum pump.

A particular feature of the hose assembly 71 is that the water delivery line 55 extends for most of its length through the interior of the suction hose 65. The water delivery line 55 enters the suction hose 65 at point 73 near the end 66 and

leaves the suction hose at 75 near the end 68. With this arrangement, for most of the length of the water delivery line 55, it is accommodated within the suction hose 65, and can be handled as a single unit. Clips 77 are provided to secure the water delivery line 55 within the suction hose 65

- 5 In operation of the machine 10, water is injected through inlet 51 into the shroud 31 for the purposes of suppressing dust generated by the cutting blade 19, as well as lubricating the blade. The injected water combines with the dust to form a slurry which is extracted from the shroud 31 along the extraction line 61. During the cutting operation, the edge 37 of the shroud 31 bears against the wall
10 or other surface in which the chasing operation is being performed and so resists leakage of slurry from the shroud 31. The dust generated during the cutting operation is carried into the shroud 31 through slot 43 by the rotating action of the blade 19, as well as by the suction created within the shroud. The flexible nature of the water line 55 connected to the inlet 51 and the flexible section 69
15 within the extraction line 61 permits the angular movement of the shroud 31 with respect to the drive head 11. Exhaust gases generated by the engine 15 discharge into the extraction line 17 and are extracted along with the slurry. The presence of water in the slurry has a cooling effect on the exhaust gases, so ensuring that the heat of the exhaust gases does not damage the extraction line
20 61 and the suction hose 65 to which it is connected. The slurry and the exhaust gases are carried along the extraction line 61 and the suction hose 65 to the vacuum pump where the slurry can be collected and the exhaust gases discharged to atmosphere. The barrier 41 ensures that rubble and other large debris does not enter the shroud 31 and block the extraction line 61 or suction
25 hose 65 connected thereto.

From the foregoing it is evident that the present embodiment provides a simple yet highly effective arrangement for suppressing dust during a chasing operation, and also for conveying slurry generated by the dust suppression process and exhaust gases generated by operation of the machine away from the worksite.

In the embodiment described, the machine 10 has been constructed specifically for the purpose of chasing and cutting operations, with the features of dust suppression and extraction of slurry and exhaust gases. It should, however, be understood that it may be possible to modify existing machines designed for cutting and chasing operations to incorporate the features of the embodiment which provides dust suppression, and extraction of generated slurry and exhaust gases.

While the embodiment has been described in relation to a machine for performing chasing and cutting operations, it should also be understood that the features of dust suppression, and slurry and exhaust gas extraction may be utilised for machines having tools other than cutting blades, such as for example drilling tools and grinding tools.

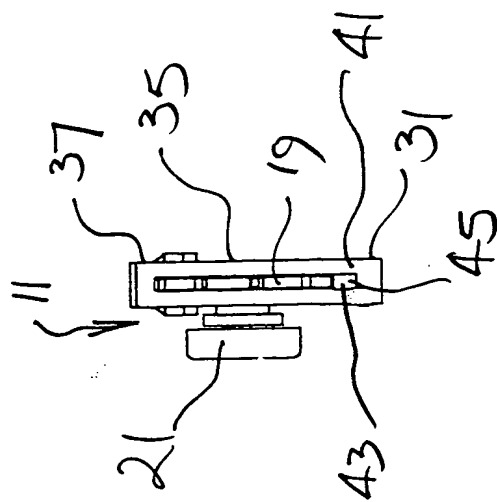
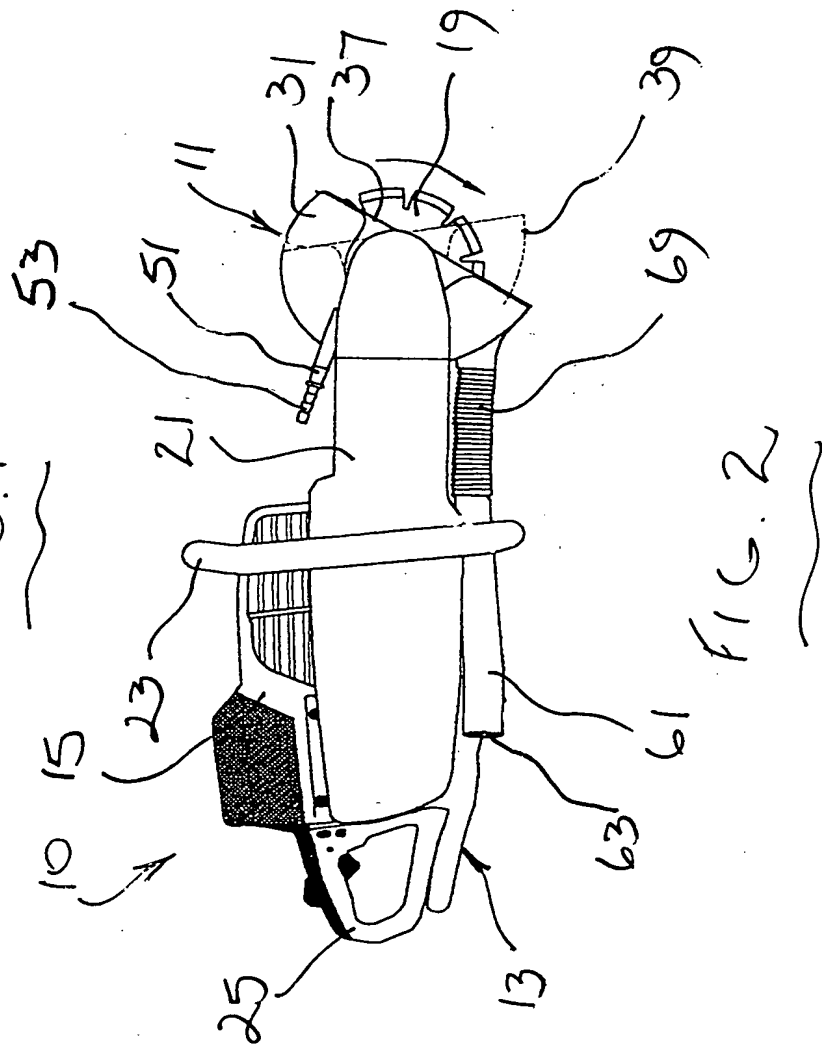
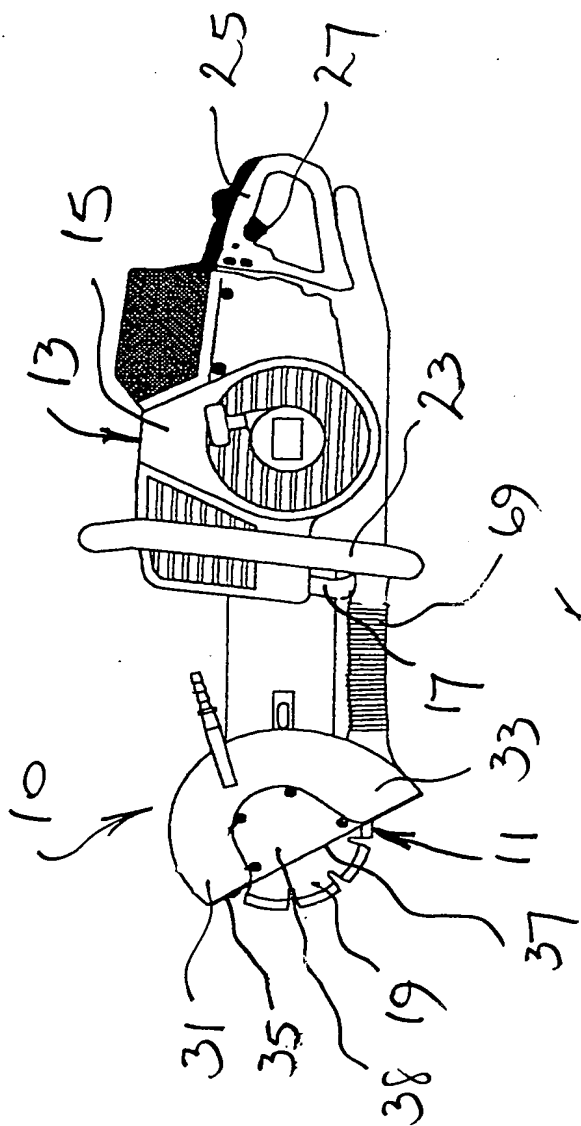
It should be appreciated that the scope of the invention is not limited to the scope of the embodiment described.

Throughout the specification, unless the context requires otherwise, the word "comprise" or variations such as "comprises" or "comprising", will be understood to imply the inclusion of a stated integer or group of integers but not the exclusion of any other integer or group of integers.

Dated this thirteenth day of June 2001

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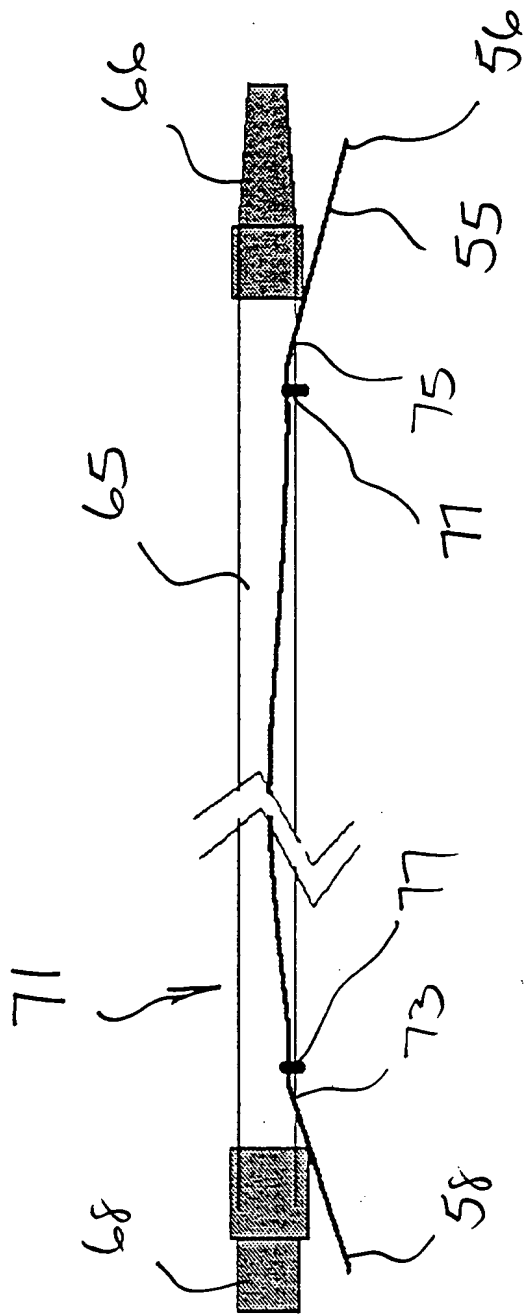


FIG. 4